AN ALTERNATIVE STOCK MANAGEMENT FOR SNOW CRAB, *CHIONOECETES OPILIO* (BRACHYURA, MAJIDAE), BASED ON THE PRESENCE OF A TERMINAL MOULT

The snow crab, *Chionoecetes opilio*, is the most important commercial crab in Canada. In the southern Gulf of St Lawrence, the landings decreased drastically from 32 000 t in 1982 to 7880 t in 1989, at which point the fishery was prematurely closed due to a high incidence of newly moulted 'white' crabs in the commercial catch.

The description of a terminal moult in male as well as female crabs (Conan and Comeau, 1986) has generated a new interpretation of the life cycle of the species. This new knowledge has important management implications for rebuilding the commercial potential of the stock.

In the Gulf of St Lawrence, processors rely on hard shell terminal moult males which moulted one year or more prior to the short ten week fishing season. At an early state of exploitation, most individuals captured in the southern Gulf were in the terminal moult phase. The catch resulted from the accumulation of 3 to 4 year classes of the terminal moult crabs. As the fishery developed, old terminal moult males were fished out and the proportion of individuals which had recently moulted immediately prior to the fishing season increased in the commercial catch. These recently recruited (called 'whites' by the fishermen) have a low commercial value and are mostly discarded at sea with a subsequent high fishery induced mortality. The harvest became based almost entirely on annual recruitment of newly moulted terminal moult individuals. Such a catch would have been ultimately of low commercial processing quality and extremely sensitive to annual fluctuations of recruitment.

The newly discovered patterns of life history are now being used for designing management strategies of the fishery. Newly moulted males have no chance to mate before a complete hardening of their carapace. The mating of terminal moult males with hard shell multiparous females takes place shortly after the spring moulting season and at the beginning of the spring and early summer fishing season, therefore only the males which reached the terminal moult one year earlier can mate efficiently. Management strategies were designed for avoiding the harvest of recent moulters. The catch would be optimised both in terms of yield per recruit and quality if only the males which have reached the terminal moult at least 12 months earlier were harvested. This can be achieved either by using traps selectively inaccessible to the less aggressive non terminal moult males, or by introducing a gauge identifying terminal moult males as a function of allometry of their larger claw size respective to carapace size.

Using geostatistical mapping techniques subareas likely to contain high densities of recently moulted males can be identified during a prefishing period survey. The geographic concentrations of recently moulted males frequently differ from the concentrations of hard shell ones and specific zones can be closed selectively prior to the fishing season in order to protect the recent moulters.

In order to rebuild the stock and stabilise the commercial landings, the protection of the annual recruitment of soft shell crabs as well as catch limitations of hard-shell terminal moult crab are required. It appears that an age group reaches the terminal moult over a series of successive years. A major, still unresolved issue is to determine whether a non terminal *C. opilio* will opt for the terminal moult over a moult period. The answer would have major implications for management since many crabs reach terminal moult at a size smaller than the existing minimal legal size.

Literature Cited

Conan, G.Y. and Comeau, M. 1986. Functional maturity and terminal moult of male snow crab *Chionoecetes opilio*. Canadian Journal of Fisheries and Aquatic Sciences 43(9): 1710-1719.

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